

## VEGETATION MAPPING USING UNMANNED AERIAL SYSTEMS (UAS) ON KING GEORGE ISLAND, MARITIME ANTARCTIC

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### ABSTRACT

The vegetation cover in maritime Antarctic is scattered and often dominated by mosses and lichens. In the few places where continuous vegetation occurs, the plant communities change from meter to meter. For a sensible mapping of such scattered or patchy vegetation ultra-high resolution is needed. The aim of this study is to map the vegetation in Arctowski area on western part of the Admiralty Bay area on King George Island in maritime Antarctic, a total area of about 1.5 square kilometre.

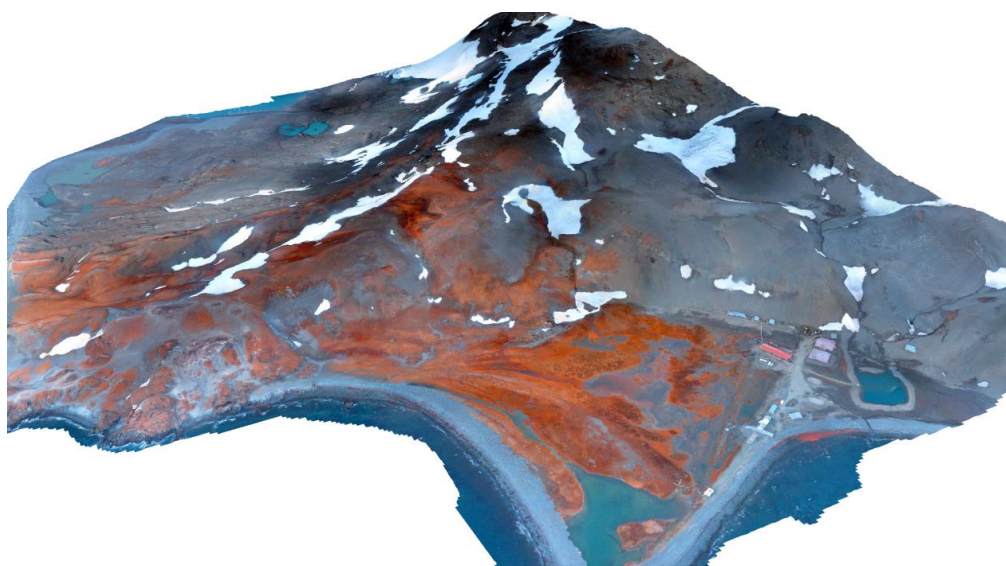


Figure 1. NDVI Image of the Arctowski area on western part of the Admiralty Bay, King George Island, Antarctic. The image is from 3 February 2016 and has 7 cm pixel resolution.

We use the Crywing Scout drone, a twin engine fully electric Unmanned Aerial Systems (UAS) with a wingspan of 2.5 m and maximum flying time of 90 minutes. The UAS is hand launched and well suited to be operated in the field with no need of a runway. The UAS was equipped with two sensors, a NDVI camera and a hyperspectral camera (Rikola), where the NDVI camera providing pixel resolution of 7 cm, and the Rikola camera pixel resolution of 30cm. First we used the hyperspectral Rikola camera on a stand in field and measured the

spectral properties for the dominated bryophytes, lichens and vascular plants in 196 bands in the range 500 to 900nm. Based on these measurements we selected the 15 most suitable bands for discriminating the main vegetation formations in the area, and used them in the hyperspectral -based mapping. However, the geo-coding of the hyperspectral data was not good enough in parts of the study area and for these parts only the NDVI data could be used. The preliminary results of the hyperspectral/NDVI based mapping indicate that three variants of Antarctic hair grass (*Deschampsia antarctica*) dominated vegetation types can be mapped, four forms of moss-dominated vegetation, where two of them are dominated by *Sanonia uncinata*, and one lichen (*Usnea antarctica*) plant community.

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